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**(54) Personalized real time information display**

(57) Information "feeds" received from multiple information sources are aggregated, re-formatted and stored in a personalized real time information display system. When the display system receives a request from a user having a personal computer or other similar display device, the system is arranged to respond with information needed to display a screen saver that includes personalized, up to date information, such as traffic, weather and sports, that is of interest to that particular user. Each user has a personalized user profile indicating (a) the categories or types of information that the user desires to receive, such as sports information, weather, investment advisories, and son on, and (b) pa-

rameters that specify, for that user, the exact information desired to be received in each category. If the user's personal computer display has remained inactive for a predetermined period of time, the screen saver is activated, causing the personal computer to access the service node, and after interchange of prestored user identification and password data, retrieve information, obtained by the system from a variety of sources, based on the user's individual profile. The retrieved information is displayed on the screen without interrupting the screen saver function, and the displayed personalized data is thereafter updated in the same manner, at user-specified time intervals.

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## Description

### Field of the Invention

This invention relates generally to the provision and display of information, and, in particular, to a system and method for personalizing a screen saver display on a personal computer (PC) or other visual display device, so that the screen saver display is periodically changed to include current up-to-date information related to items that interest the user of the PC.

### Background of the Invention

A user having a display device such as a personal computer (PC) (or a similar visual display device such as a screen telephone), often will employ a screen saver to display pictorial information on the device when the device has remained inactive for a predetermined period of time. While the screen saver can be personalized to cause various time-varying patterns to be displayed, thereby avoiding burn-in on the screen surface, the display does not itself convey useful information to the user.

### Summary of the Invention

In accordance with the present invention, information "feeds" received from multiple information sources are aggregated, re-formatted and stored in a service node that may be disposed in, and thus be a part of, a telecommunications network, or, alternatively, that may be outside of the network, but that is accessed through the telecommunications network. When the service node receives a request from a user having a personal computer or other similar display device, the service node is arranged to respond with information needed to display a screen saver that includes personalized, up to date, information, such as traffic, weather and sports, that is of interest to that particular user.

When a user initially arranges to use the present invention, a personalized user profile is established, indicating (a) the categories or types of information that the user desires to receive, such as sports information, weather, investment advisories, and so on, and (b) parameters that specify, for that user, the exact information desired to be received in each category. If the user's personal computer display has remained inactive for a predetermined period of time, the screen saver is activated, causing the personal computer to access the service node. The screen saver application transmits user identification and password data, previously stored in the screen saver application, to the service node. The PC requests information from the service node, which information was obtained by the service node from a variety of sources, based on the user's individual profile. The service node formats the information for display on the user's device, the information is transmitted from the service node to the PC, and the retrieved information is

displayed on the device without interrupting the screen saver function. The displayed personalized data is thereafter updated in the same manner, by arranging the personal computer to make periodic requests for information. Accordingly, the information that is displayed as a screen saver is always "current".

In accordance with one aspect of the present invention, the service node includes several clients in an information feed interface that, in effect, insulates information providers from direct connection to users, and assures that any necessary formatting and "publishing" changes required for display by the users' information obtained from providers is digested and stored/arranged in individual databases within the service node, so that the information is available for efficient user access. In accordance with another aspect of the present invention, pre-established user profiles are maintained in the service node, in order to enable retrieval and display of the desired information. However, the system is arranged to make intelligent selection of "default" profiles, based on factors that can be ascertained even about a new user, such as the user's location from which a request is initiated. This allows the system to customize information even for users who have not pre-specified a profile.

### Brief Description of the Drawings

The present invention will be more fully appreciated by consideration of the following detailed description which should be read in light of the accompanying drawing in which:

Fig. 1 is a block diagram illustrating the overall arrangement of the present invention and the environment in which the invention operates;

Fig. 2 is a block diagram illustrating the arrangement of database 135 within server 130 of Fig. 1;

Fig. 3 is a flow diagram illustrating one embodiment of the process used to provide customized, up to date information to a personal computer end user device; and

Fig. 4 is an example of an "At-A-Glance" screen saver display which integrates personalized information obtained from a variety of user-specified services using the present invention.

### Detailed Description

Referring first to Fig. 1, there is shown a block diagram illustrating the overall arrangement of the present invention and the environment in which the invention operates. A service node, designated generally as 120, is arranged to provide a plurality of users having personal computers 101 (or other terminals with visual display capability), with personalized, up to date information, such as traffic, weather and sports, that is of interest to each particular user, that can be displayed as a screen saver

when the personal computer remains idle for a predetermined period of time. Representative multimedia terminals other than the personal computers 101 shown in Fig. 1 can include a screen phone, such as a Picturephone 2500 available from AT&T Corp., a television equipped with a set top box (such as the TV Information Center available from AT&T Corp.) providing an interactive capability, or a personal digital assistant, such as a MagicLink device available from Sony.

Personal computers 101 are connected to service node 120 through a telecommunications network 110, which may include switches and other elements in local exchange carrier networks as well as interexchange carrier networks. In some embodiments of the present invention, service node 120 may be disposed within telecommunications network 110, and thus be part of either a local exchange carrier network or an interexchange carrier network.

As shown in Fig. 1, service node 120 includes a server 130 and an information feed interface 140. Server 130 is connected to personal computers 101 through telecommunications network 110, and provides the information needed to provide a display on the PC's of the type illustrated in Fig. 4 that is described in more detail below. Information feed interface 140 is connected to server 130 as well as to a plurality of information providers that may be at different remote locations. As explained below, these information providers may include, for example, a weather provider 150, a traffic provider 152 and a financial information provider 154. Commercial TCP/IP networking software may be used to provide the communications interface between server 130 and information feed interface 140.

Server 130, which may be a workstation such as the Sparc 20 available from Sun Microsystems, is arranged to perform various processes, including parsing the information received from information providers and storing the parsed data in a database, as well as other functions described below, using a microprocessor 139 operating under the control of programs stored in a file system 137. Microprocessor 139 has access to information stored in a database 135, which stores information of the types illustrated in Fig. 2, discussed below. Information and instructions are communicated between microprocessor 139 and personal computers 101 using a first communications manager 131, which acts as a communications interface and protocol converter. Communications manager 131 includes usage profile management module 136, that provides system usage information needed for administration and billing purposes for each user. Communications manager 131 also includes database query routines 138 that are used to gain access to user data and stored information pertinent to each user. A second communication manager 133 provides a communications interface between server 130 and information feed interface 140. Communication manager 133 includes parsing routines 134 in order to break-down the information received from information

feed interfaces 140 into addressable data fields (e.g., date, time, location, traffic report) and then store the data fields in the appropriate portion of database 135. Operations, administration, and maintenance (OA&M) routines 132 are also provided in server 130. These routines operate, administer, and maintain service node 120. This allows a system operator to monitor the status of service node 120, perform software/data backups and restorations, resolve operating alarms, provide usage data required for billing, and so on.

Communications manager 131 implements a data link communications protocol and an applications protocol for communication with personal computers 101 or any other multimedia terminal that is employed as an end user device. The data link communications protocol defines how "bits" are packaged, while the applications protocol defines how to interpret the bits (i.e., what is the information). This includes provision of user applications that format user application generated data so that it can be understood and displayed by the personal computer or other end user device. Formatting may be accomplished using a language such as HyperText Markup Language (HTML) commonly used by the World Wide Web.

Server 130 also includes a file system 137, which contains information and programs necessary to control and operate service node 120.

Information feed interface 140 includes a plurality of clients 142-144, each of which provide an interface to a corresponding one of the information providers 150, 152 and 154. Thus, weather client 143 is connected to and interfaces with weather provider 150, traffic provider 142 is connected to and interfaces with traffic provider 152, and financial client 144 is connected to and interfaces with financial information provider 154. Each of the clients 142-144 include local processors that may be configured in one of several ways. First, the clients may periodically connect to the associated information provider and download information that is available from the provider. In this configuration, the clients can also answer calls from an information provider and receive information sent by the provider. In an alternative configuration, the clients may maintain a continuous communications link to the information provider, and either download information (service node initiated) or receive information (provider initiated). Clients 142-144 may be implemented in commercially available personal computers using commercially available communications software, such as Procomm-Plus. In either event, the client arrangement in effect insulates information providers from direct connection to users, and assures that any necessary formatting and "publishing" changes required for display by the user's display system are made.

It is to be noted here that the arrangement of 110 shown in Fig. 1 is illustrative only, and that the precise connection between the personal computers 101 or other multimedia terminal equipment used by any user and

service node 120 will also depend upon the communications facility that is available to interconnect that user with service node 120. What is essential to the present invention is that information "feeds" received from multiple information sources are aggregated, re-formatted and stored in the service node, for later access by a user. For example, if a particular user has an ISDN terminal, the user may be connected directly to server 130 via an ISDN line.

Referring now to Fig. 2, there is shown a block diagram illustrating the arrangement of database 135 within server 130 of Fig. 1. Generally speaking, server 130 includes a plurality of individual databases such as traffic database 171, weather database 172, and financial database 173, containing information obtained from the various information providers. Other information databases 175 may also be provided, depending upon the types of information that are available from information providers and thus can be offered to users of the system. Database 135 also contains other databases such as a user profile database 174 and usage records 176. User profile database 174 contains information for each user of the system, specifying (a) the categories or types of information services that are to be provided to that user, and (b) for those information services, the parameters that are associated with the desired information. For example, a first user may desire traffic, financial and sports information, a second user may desire weather and news information, and a third user may desire traffic, news and weather. For each of these three users, the detailed information desired may be different. Thus, the first user may desire traffic information for certain roadways, financial information for certain securities, and sports information for particular teams. The second user may desire to obtain some of the same types of information, but the details will be different. In this example, the second user may desire local news and weather for City A, while the third user may desire news and weather for a different location, City B. The database management system in server 130 may be implemented using a commercially available relational database management system, such as Informix®.

Referring now to Fig. 3, there is shown a flow diagram illustrating one embodiment of the process used to provide customized, up to date information to a personal computer end user device 101 that accesses service node 120. Each block in Fig. 3 identifies the operations performed by personal computer 101 and by service node 120 to provide the functionality contemplated by the present invention. The steps in the process assure that when the system receives a request from a screen saver application running on a personal computer or other similar display device, the system can respond with information needed to display a screen saver that includes personalized, up to date information, such as traffic, weather and sports, that is of interest to that particular user.

The process begins in step 300, in which a deter-

mination is made as to whether the screen saver is activated, such that it requires information from the present invention. If a NO result is obtained, indicating that the screen saver is not activated, the process loops, such that step 300 is repeated until a YES result is obtained. This loop will generally continue until a user-specified period of PC inactivity has elapsed (e.g., five minutes).

When a YES result occurs in step 300, the screen saver is activated and the process for retrieving current up-to-date data is initiated by proceeding to step 301, in which a communication session is established between personal computer 101 and service node 120. This step may also be triggered after the screen saver has been active for a user-specified period of time (e.g., fifteen minutes). In both cases personal computer 101 is arranged to generate a query or transmit a message to service node 120, typically by dialing a predefined telephone number. Service node 120 is arranged to answer the call and send a "challenge" message to personal computer 101. In turn, personal computer 101 responds with an acknowledgment message, which is sent back to service node 120.

Once a communication session is established in step 301, a determination is made in step 303 as to whether two-way communications are enabled between a personal computer 101 and service node 120. If not, an error condition exists, and the process proceeds to step 305, in which personal computer 101 terminates the connection to service node 120 and displays an appropriate error message to the user. Concurrently, service node 120 terminates the partially established communication session. At this point, the PC screen saver may attempt to re-initiate communications, as by repeating the process of step 301.

If a YES result is obtained in step 303, the process proceeds to step 307, in which the user identification number (ID) is validated, or another validation process is performed. In this step, personal computer 101 sends the prestored user ID to service node 120, whereupon service node 120 checks the ID against stored information in database 135 to determine its validity. Depending upon the outcome, service node 120 sends a valid ID or invalid ID message to personal computer 101.

It is to be noted here that information is stored in database 135 when a user initially arranges to use the display system of the present invention. At that time, a personalized user profile is established, indicating (a) the categories or types of information that the user desires to receive, such as sports information, weather, investment advisories, and so on, and (b) parameters that specify, for that user, the exact information desired to be received in each category. The profile may be created in a number of ways, such as by communicating with an interactive voice platform such as a Conversant® voice response system available from AT&T Corp., or by using a PC application to select desired service options.

If the ID transmitted by the PC screen saver is not valid, the process continues with a NO result in step 309

and proceeds to step 311, where the error condition is dealt with. In that step, both personal computer 101 and service node 120 terminate the existing communications session, and personal computer 101 displays an appropriate message to the user.

If the ID transmitted by the PC screen is valid, the process continues with a YES result in step 309 and proceeds to step 313, in which the user's personalized information is retrieved from data base 135. In this step, personal computer 101 requests the personalized information from service node 120, service node 120 accesses the user's profile, and queries data base 135 for the specific information desired by this user, based upon the profile information.

Next, in step 315, the user's personalized information is appropriately formatted. In this step, the information retrieved in step 313 is actually transmitted from service node 120 to personal computer 101.

In step 317, a determination is then made as to whether an error condition has occurred with respect to the retrieval, formatting and transmission of information to the user. If a YES result is obtained, indicating an error, the process proceeds to step 319, which, like step 311, results in both personal computer 101 and service node 120 terminating the existing communications session, and personal computer 101 displaying an appropriate message to the user.

Following step 317, if an error condition has not occurred, the process proceeds to step 321, in which the communication session between service node 120 and personal computer 101 is terminated. In this step, personal computer 101 sends a terminate session message to service node 120, whereupon service node 120 and personal computer 101 both terminate the communication session. In step 323, the information retrieved in step 313 and formatted in step 315 is displayed on the user's personal computer 101, in the context of the PC screen saver without interrupting the screen saver function.

It is important to note that the screen saver function remains active throughout all the steps illustrated in Fig. 3 and that all these steps take place automatically, that is without user input.

Referring now to Fig. 4, there is shown an example of an "At-A-Glance" screen saver display which integrates personalized information obtained from a variety of user-specified services using the present invention. The display integrates information from a variety of user-specified services, and presents the user with valuable information without being required to navigate through a series of menus. As shown, a series of screen areas 401-406 "float" or randomly move throughout the display area 400, preferably without interfering with or covering each other. Each of the display areas contain different information, relating to topics selected by the user, including, in this example, weather (areas 402 and 403), traffic (area 401), news (area 405), financial (area 404) and other information (area 406), in this case per-

taining to communications messages waiting for the user. The information displayed in areas 401-406 is up-to-date, since it was recently obtained from service node 120, and it is customized, in that the information within each of the areas 401-406 was selected by the user and set forth in his or her profile. As the data is updated, the screen saver remains active and the screen saver motion is not interrupted. Numerous variations of the screen saver user presentation are possible.

Various modifications and adaptations of the present invention will be apparent to persons skilled in the art. For example, instead of pre-stored profiles for individual users, the system can be arranged to make intelligent selection of "default" profiles, based on factors that can be ascertained even about a new user, such as the user's location from which a request is initiated. Thus, a user calling service node 120 from a telephone located in New Jersey will, unless different information is requested, automatically receive information about traffic and weather conditions in New Jersey. This allows the system to customize information even for users who have not stored or pre-specified a profile. Accordingly, it is intended that the invention be limited only by the appended claims.

#### Claims

1. A system for displaying personalized time-varying information on a visual display device, comprising
  - a service node including a database,
  - an information feed interface in said service node arranged to obtain information from one or more information providers and to store said information in said database,
  - a server in said service node arranged to maintain a profile for each user of said system, said profile indicating particular stored information in said database to be provided to said each user, and
  - a communications manager for downloading said particular stored information to said visual display device.
2. The invention defined in claim 1 wherein said visual display device is arranged to display said particular stored information as a screen saver, whenever the screen saver is activated.
3. The invention defined in claim 1 wherein said service node is disposed in a telecommunications network.
4. The invention defined in claim 1 wherein said communications manager is arranged to perform said downloading in response to a command from said visual display device.

5. The invention defined in claim 1 wherein said visual display device is a personal computer.
6. A method for displaying personalized time varying information as a screen saver on a visual display device, comprising the steps of

obtaining information from one or more information providers and storing said information in said database, 10  
maintaining a profile for each user of said system, said profile indicating particular stored information in said database to be provided to said each user,  
downloading said particular stored information 15  
to said visual display device, and  
displaying said particular stored information on said visual display device whenever the screen saver is activated.

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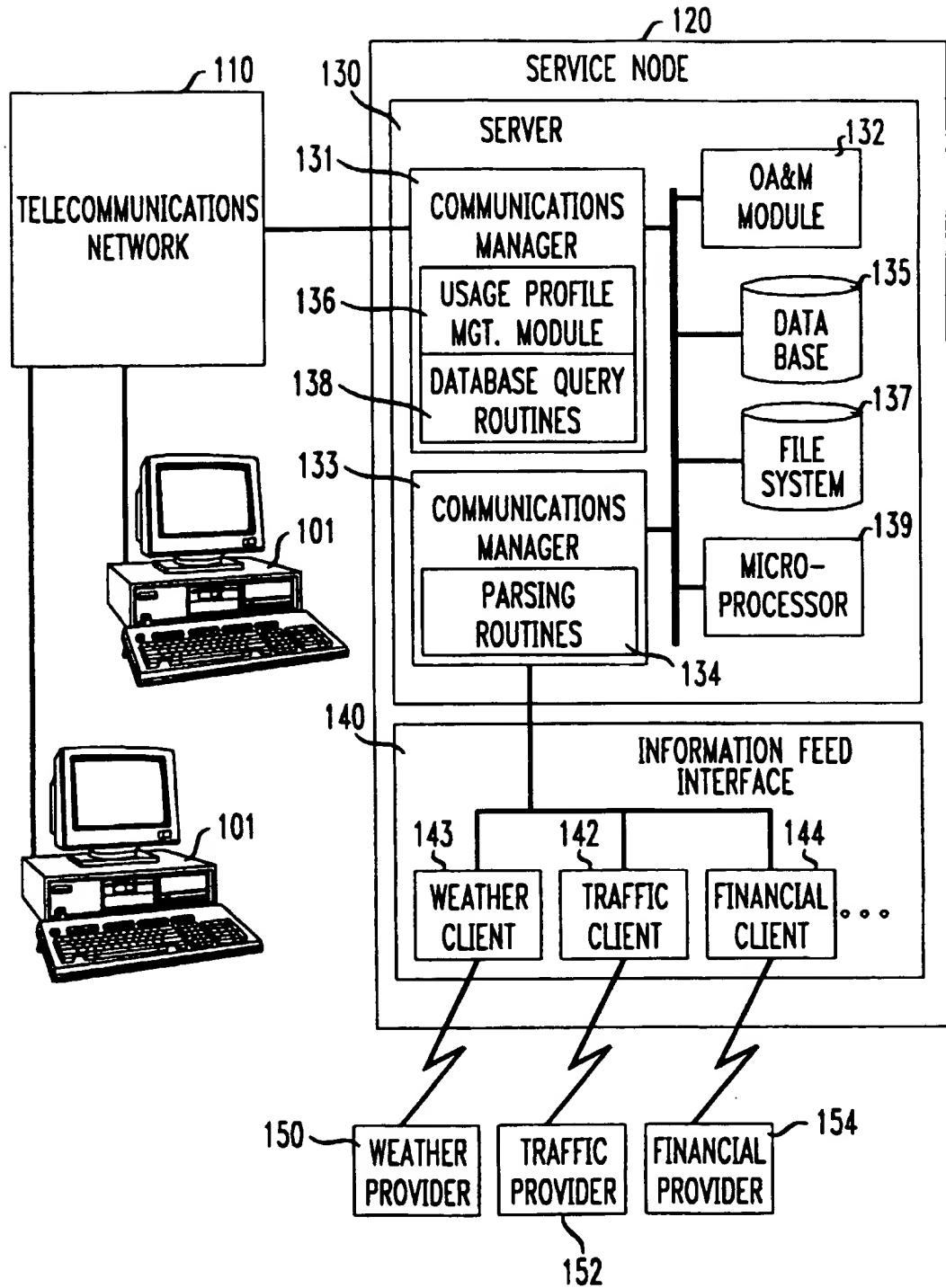
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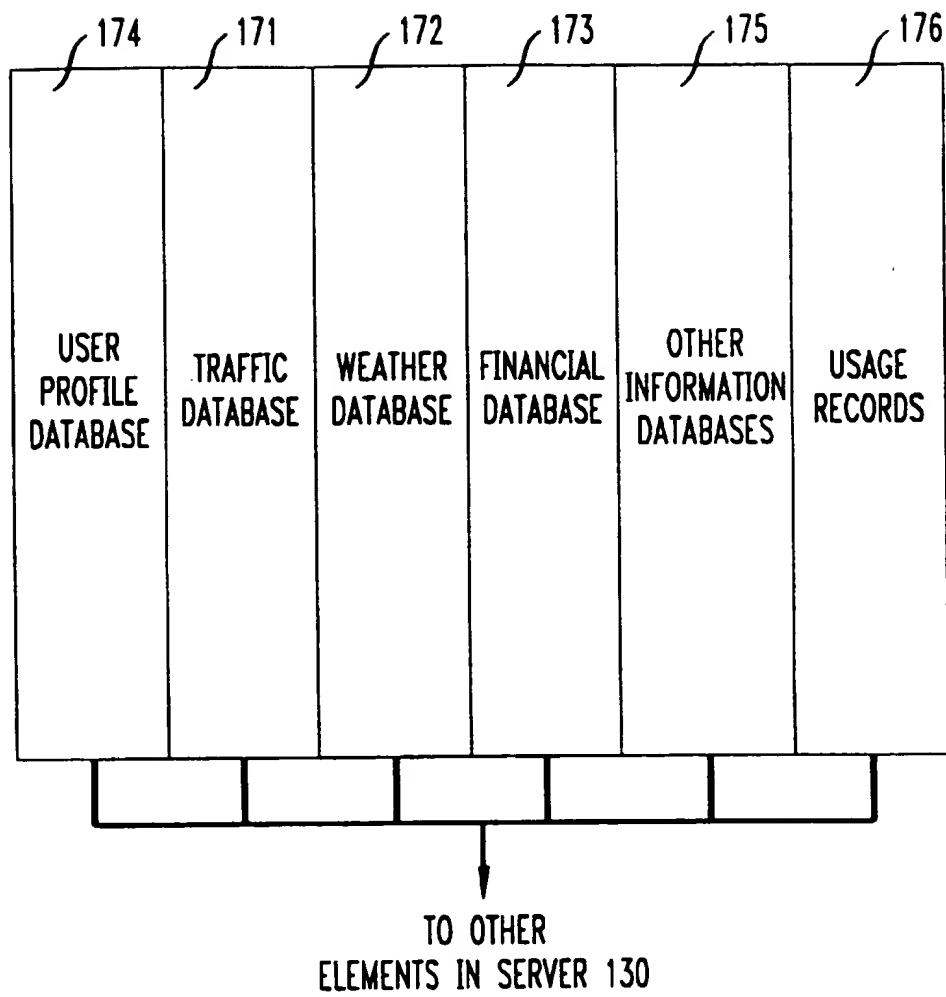
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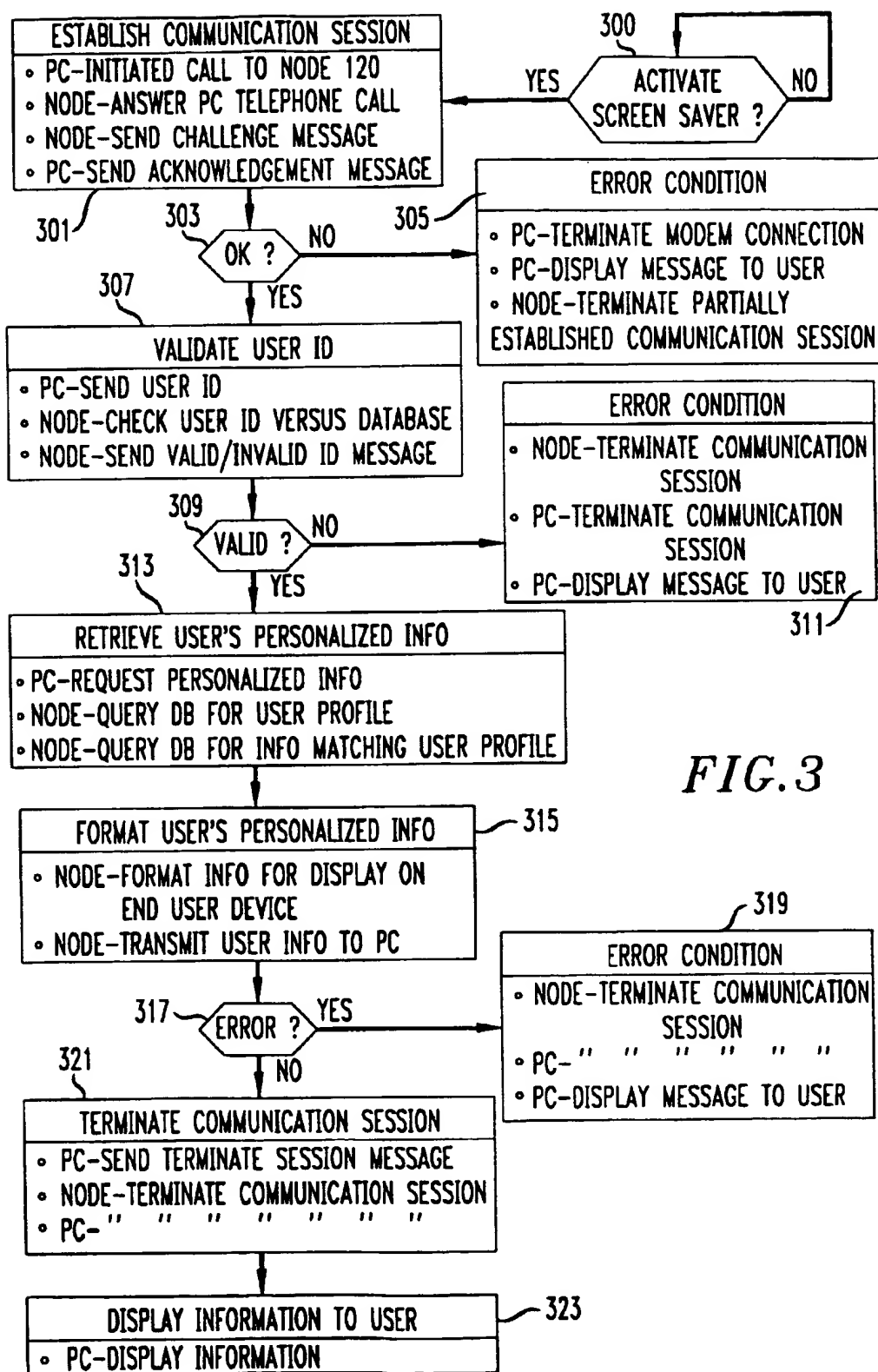
*FIG. 1*



*FIG. 2*







*FIG. 3*

FIG. 4

